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EXAMINER

HYUN, PAUL SANG HWA

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



### **DETAILED ACTION**

The amendment filed on December 01, 2008 has been acknowledged.

Claims 9, 11-13, 16, 27-34 are currently pending wherein claims 9, 16 and 27 remain withdrawn for being drawn to a non-elected invention. Applicant amended claims 11, 16 and 27, and added new claims 32-34. It should be noted that new claims 33 and 34 are dependent on withdrawn claims. Thus, they are withdrawn from further consideration by the Examiner and will not be examined on the merits. In summary, claims 11-13 and 28-32 are pending for examination on the merits.

### ***Specification***

Claim 32 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

Claim 32 does not further limit claim 11 because the invention recited in claim 11 comprises all the limitations recited in claim 32. Specifically, the invention recited in claim 11 comprises an upper substrate wherein a surface of the upper substrate contacts each of the claimed micro pillar.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims **11 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin et al. (US 6,632,652 B1) in view of Austin et al. (US 5,427,663) and Wang et al. (US 2003/0119920 A1).

Austin et al. ('652) disclose a molecular sieve for separating biomolecules (see Fig. 7). The sieve comprises a substrate, an array of microstructures 86 protruding integrally from the substrate, and a cover 88 in contact with each microstructure. The microstructures can be formed from an elastomeric polymer (see claim 3). The height of the microstructures can range between 10 nm and 20 microns. The sieve disclosed by

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Austin et al. ('652) differs from the claimed invention in that the reference does not disclose that the microstructures have a circular cross section. In addition, the reference does not disclose the aspect ratio of the microstructures.

With respect to the cross sectional shape, Austin et al. ('663) disclose a molecular sieve comprising an array of microstructures. The reference discloses that the cross sectional shape of the microstructures can be rectangular or round (see Abstract). In light of the disclosure of the '663 patent, and depending on the sample to be separated, it would have been obvious to use microstructures having a circular cross section in the sieve disclosed by the '652 patent to optimize the separation rate.

With respect to the aspect ratio, Wang et al. disclose a molecular sieve comprising an array of nanostructures disposed on top of a substrate (see [0043]). The reference discloses that the aspect ratio of the nanostructures is at least 3 and preferably at least 10 (see [0044]). In light of the disclosure of Wang et al., it would have been obvious to use microstructures having an aspect ratio greater than 4 to separate biomolecules since an array having such a ratio is suitable for separating biomolecules. Likewise, if the microstructures had an aspect ratio of at least 4, the diameter of the microstructures of the modified Austin et al. sieve would fall within the claimed range.

Claims **12 and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin et al. (US 6,632,652 B1) in view of Austin et al. (US 5,427,663) and Wang et al. as applied to claims 11 and 32, and further in view of Noca et al. (US 2003/0052006 A1).

None of Austin et al. and Wang et al. disclose that the microstructures are functionalized.

Noca et al. disclose a molecular sieve for separating biomolecules in a fluid sample. The sieve comprises an array of nanotubes arranged on a substrate wherein the nanotubes can be functionalized with chemical groups for facilitating the separation of the biomolecules (see [0043]). In light of the disclosure of Noca et al. it would have been obvious to one of ordinary skill in the art to functionalize the microstructures of the modified Austin et al. sieve with chemical groups (i.e. antigens) to optimize the separation of biomolecules.

Claims **28 and 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin et al. (US 6,632,652 B1) in view of Austin et al. (US 5,427,663) and Wang et al. as applied to claims 11 and 32, and further in view of Agrawal et al. (US 7,195,872 B2).

None of Austin et al. and Wang et al. disclose microstructures formed by the claimed method.

Agrawal et al. disclose a substrate comprising a textured surface defined by microfeatures. The substrate and the microfeatures can be a thermoplastic organic polymer and the microfeatures can be made integral with the substrate by forming the microfeatures using compression molding (see lines 55-60, col. 7). The reference discloses that compression molding can produce microfeatures in a single step. In light of the disclosure of Agrawal et al., it would have been obvious to one of ordinary skill in

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the art to form the microfeatures of the modified Austin et al. sieve by means of compression molding.

Claim **29 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Austin et al. (US 6,632,652 B1) in view of Austin et al. (US 5,427,663), Wang et al. and Agrawal et al. as applied to claims 28 and 31, and further in view of Noca et al.

None of Austin et al., Wang et al. and Agrawal et al. disclose microstructures that are functionalized.

Noca et al. disclose a molecular sieve for separating biomolecules in a fluid sample. The sieve comprises an array of nanotubes arranged on a substrate wherein the nanotubes can be functionalized with chemical groups for facilitating the separation of the biomolecules (see [0043]). In light of the disclosure of Noca et al. it would have been obvious to one of ordinary skill in the art to functionalize the microstructures of the modified Austin et al. sieve with chemical groups (i.e. antigens) to optimize the separation of biomolecules.

### ***Response to Arguments***

Applicant's arguments with respect to the claims have been considered but they are moot in view of the new grounds of rejection. The amendment necessitated new grounds of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL S. HYUN whose telephone number is (571)272-8559. The examiner can normally be reached on Monday-Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul S Hyun/  
Examiner, Art Unit 1797

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797